

```
=> b hcaplus
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FILE COVERS 1907 - 19 Jul 2004 VOL 141 ISS 4
FILE LAST UPDATED: 18 Jul 2004 (20040718/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

'OBI' IS DEFAULT SEARCH FIELD FOR 'HCAPLUS' FILE

```
=> d que 186
L43      34190 SEA FILE=HCAPLUS ABB=ON PLU=ON 9005-53-2/RN OR 42/OBI
L49      82314 SEA FILE=HCAPLUS ABB=ON PLU=ON "SODIUM HYDROXIDE"/CT OR
          1310-73-2/RN OR NA/OBI(A)HYDROXIDE/OBI OR NAOH/OBI OR SODIUM/OB
          I(A)HYDROXIDE/OBI
L50      237517 SEA FILE=HCAPLUS ABB=ON PLU=ON ETHANOL/CT OR 64-17-5/RN OR
          ETHANOL?/OBI
L54      4764 SEA FILE=HCAPLUS ABB=ON PLU=ON L43 (L) (PROC+NT) /RL
L57      241058 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 OR ETOH/OBI OR ETHYL/OBI(A)
          )ALCOHOL?/OBI
L58      24733 SEA FILE=HCAPLUS ABB=ON PLU=ON L57 (L) (PREP+NT) /RL
L59      33 SEA FILE=HCAPLUS ABB=ON PLU=ON L54 AND L58
L86      6 SEA FILE=HCAPLUS ABB=ON PLU=ON L59 AND L49
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```
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MEDLINE thesauri in the /CN, /CT, and /MN fields incorporate the MeSH 2004 vocabulary. See <http://www.nlm.nih.gov/mesh/> and http://www.nlm.nih.gov/pubs/techbull/nd03/nd03_mesh.html for a description of changes.

This file contains CAS Registry Numbers for easy and accurate substance identification.

```
=> d que 168
L61      1699 SEA FILE=MEDLINE ABB=ON PLU=ON LIGNIN/CT
L63      47979 SEA FILE=MEDLINE ABB=ON PLU=ON ETHANOL/CT
L67      52 SEA FILE=MEDLINE ABB=ON PLU=ON L63 (L) CS
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L68 4 SEA FILE=MEDLINE ABB=ON PLU=ON L67 AND L61

=> b biosis
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CAS REGISTRY NUMBERS AND CHEMICAL NAMES (CNS) PRESENT
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RECORDS LAST ADDED: 15 July 2004 (20040715/ED)

FILE RELOADED: 19 October 2003.

=> d que 185
L69 3490 SEA FILE=BIOSIS ABB=ON PLU=ON LIGNIN/CT,CW
L70 24471 SEA FILE=BIOSIS ABB=ON PLU=ON ETHANOL/CT,CW
L71 27904 SEA FILE=BIOSIS ABB=ON PLU=ON L70 OR ETOH OR ETHYL(A)ALCOHOL?
OR ETHANOLS
L78 24452 SEA FILE=BIOSIS ABB=ON PLU=ON LIGN? OR L69
L80 62816 SEA FILE=BIOSIS ABB=ON PLU=ON ?CELLULOS?
L81 82122 SEA FILE=BIOSIS ABB=ON PLU=ON L78 OR L80
L82 645 SEA FILE=BIOSIS ABB=ON PLU=ON L71 AND L81
L83 10464 SEA FILE=BIOSIS ABB=ON PLU=ON SODIUM(A)HYDROXIDE OR SODIUM(W)
HYDROXIDE/CT OR NAOH OR NA(A)OH
L84 11 SEA FILE=BIOSIS ABB=ON PLU=ON L83 AND L82
L85 7 SEA FILE=BIOSIS ABB=ON PLU=ON L84 AND PY<=2001

=> b wpix
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FILE LAST UPDATED: 12 JUL 2004 <20040712/UP>
MOST RECENT DERWENT UPDATE: 200444 <200444/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

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FILE LAST UPDATED: 18 Jul 2004 (20040718/ED)

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=> d que 186
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          1310-73-2/RN OR NA/OBI(A)HYDROXIDE/OBI OR NAOH/OBI OR SODIUM/OB
          I(A)HYDROXIDE/OBI
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          ETHANOL?/OBI
L54      4764  SEA FILE=HCAPLUS ABB=ON   PLU=ON  L43 (L) (PROC+NT) /RL
L57      241058 SEA FILE=HCAPLUS ABB=ON   PLU=ON  L50 OR ETOH/OBI OR ETHYL/OBI(A)
          )ALCOHOL?/OBI
L58      24733 SEA FILE=HCAPLUS ABB=ON   PLU=ON  L57 (L) (PREP+NT) /RL
L59      33    SEA FILE=HCAPLUS ABB=ON   PLU=ON  L54 AND L58
L86      6     SEA FILE=HCAPLUS ABB=ON   PLU=ON  L59 AND L49
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MEDLINE thesauri in the /CN, /CT, and /MN fields incorporate the MeSH 2004 vocabulary. See <http://www.nlm.nih.gov/mesh/> and http://www.nlm.nih.gov/pubs/techbull/nd03/nd03_mesh.html for a description of changes.

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L63      47979 SEA FILE=MEDLINE ABB=ON   PLU=ON  ETHANOL/CT
L67      52    SEA FILE=MEDLINE ABB=ON   PLU=ON  L63 (L) CS
```

L68 4 SEA FILE=MEDLINE ABB=ON PLU=ON L67 AND L61

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CAS REGISTRY NUMBERS AND CHEMICAL NAMES (CNs) PRESENT
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FILE RELOADED: 19 October 2003.

=> d que 185
L69 3490 SEA FILE=BIOSIS ABB=ON PLU=ON LIGNIN/CT,CW
L70 24471 SEA FILE=BIOSIS ABB=ON PLU=ON ETHANOL/CT,CW
L71 27904 SEA FILE=BIOSIS ABB=ON PLU=ON L70 OR ETOH OR ETHYL(A)ALCOHOL?
OR ETHANOLS
L78 24452 SEA FILE=BIOSIS ABB=ON PLU=ON LIGN? OR L69
L80 62816 SEA FILE=BIOSIS ABB=ON PLU=ON ?CELLULOS?
L81 82122 SEA FILE=BIOSIS ABB=ON PLU=ON L78 OR L80
L82 645 SEA FILE=BIOSIS ABB=ON PLU=ON L71 AND L81
L83 10464 SEA FILE=BIOSIS ABB=ON PLU=ON SODIUM(A)HYDROXIDE OR SODIUM(W)
HYDROXIDE/CT OR NAOH OR NA(A)OH
L84 11 SEA FILE=BIOSIS ABB=ON PLU=ON L83 AND L82
L85 7 SEA FILE=BIOSIS ABB=ON PLU=ON L84 AND PY<=2001

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 NEW FORMAT GERMAN PATENT APPLICATION AND PUBLICATION
 NUMBERS. SEE ALSO:
[<<<](http://www.stn-international.de/archive/stnews/news0104.pdf)

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=> d que 197
L89      17176 SEA FILE=WPIX ABB=ON PLU=ON LIGN?/BIX
L90      89920 SEA FILE=WPIX ABB=ON PLU=ON (ETHANOL? OR ETHYL(W)ALCOHOL? OR
          ETOH)/BIX
L92      63324 SEA FILE=WPIX ABB=ON PLU=ON (SODIUM(W)HYDROXIDE OR NAOH OR
          NA(W)HYDROXIDE)/BIX
L94      121813 SEA FILE=WPIX ABB=ON PLU=ON ?CELLULOS?/BIX
L95      452 SEA FILE=WPIX ABB=ON PLU=ON ((L89 OR L94) AND L90) AND L92
L97      8 SEA FILE=WPIX ABB=ON PLU=ON BIOMASS/BIX AND L95
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=> dup rem 185 168 186 197
FILE 'BIOSIS' ENTERED AT 14:20:24 ON 19 JUL 2004
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FILE 'MEDLINE' ENTERED AT 14:20:24 ON 19 JUL 2004

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PROCESSING COMPLETED FOR L85
PROCESSING COMPLETED FOR L68
PROCESSING COMPLETED FOR L86
PROCESSING COMPLETED FOR L97
L104 25 DUP REM L85 L68 L86 L97 (0 DUPLICATES REMOVED)

=> d all ibib abs hitind l104 1-25

L104 ANSWER 1 OF 25 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2004:513158 HCAPLUS
DN 141:55921
ED Entered STN: 25 Jun 2004
TI Production of carbohydrates, alcohol and resins from biomass
IN Blount, David H.
PA USA
SO U.S. Pat. Appl. Publ., 9 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM C08B037-00
ICS C12P007-06
NCL 435161000; 536123000
CC 43-2 (Cellulose, Lignin, Paper, and Other Wood Products)
Section cross-reference(s): 45
FAN.CNT 1
 PATENT NO. KIND DATE APPLICATION NO. DATE
 ----- ----- ----- -----
PI US 2004121436 A1 20040624 US 2001-754580 20010105
PRAI US 2001-754580 20010105
AB Ethanol is produced from biomass by the process of a heated aqueous solution
containing 20-40% alkali metal hydroxide to break the lignin-cellulose bond.

Then the biomass is heated further to remove carbon dioxide from the cellulose and lignin to produce a mixture of carbohydrates, modified Na lignin, micro-cellulose, lignin-cellulose resinous products and sodium carbonate. Water is added to the mixture and most of the mixture is water soluble. An acidic salt forming compound is added to the aqueous solution until a pH

of 3-7 is obtained. The lignin is precipitated. The lignin-cellulose resinous products float to the top and is skimmed off. The solution containing the carbohydrates and salt is decanted off the lignin and is concentrated by evaporating

off water. The carbohydrates crystallizes from the solution and the water and salt is filtered off. Water is added to the carbohydrates then it is fermented to form ethanol. The ethanol is recovered from the water by evaporation. The water, sodium hydroxide and calcium oxide are recovered for reuse and the lignin may be burned to furnish heat for the process. The reaction of the sodium hydroxide with the biomass is exothermic and furnishes heat for this process and heat is captured by a heat exchanger.

ST biomass utilization lignin cellulose cooking fermn alc prodn

IT Biomass

Wood

(production of carbohydrates, ethanol and resins from biomass)

IT Carbohydrates, preparation

RL: IMF (Industrial manufacture); PREP (Preparation)

(production of carbohydrates, ethanol and resins from biomass)

IT 9004-34-6, Cellulose, processes 9034-32-6, Hemicellulose

RL: BCP (Biochemical process); CPS (Chemical process); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process)

(production of carbohydrates, ethanol and resins from biomass)

IT 64-17-5P, Ethanol, preparation

RL: BMF (Bioindustrial manufacture); BIOL (Biological study);
PREP (Preparation)

(production of carbohydrates, ethanol and resins from biomass)

IT 9005-53-2, Lignin, processes

RL: CPS (Chemical process); PEP (Physical, engineering or
chemical process); PROC (Process)

(production of carbohydrates, ethanol and resins from biomass)

IT 1305-62-0, Calcium hydroxide, uses 1310-73-2, Sodium
hydroxide, uses

RL: NUU (Other use, unclassified); USES (Uses)

(production of carbohydrates, ethanol and resins from biomass)

IT 124-38-9, Carbon dioxide, occurrence

RL: OCU (Occurrence, unclassified); OCCU (Occurrence)

(production of carbohydrates, ethanol and resins from biomass)

L104 ANSWER 2 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-301252 [29] WPIX

DNC C2003-078691

TI Separation of hemicellulose from hemicellulose
-containing biomass, especially wood, useful for preparation of
pharmaceutical xylan and xylan polysulfate.

DC F09

IN KARSTENS, T

PA (RHOD) RHODIA ACETOW GMBH

CYC 101

PI WO 2003025280 A1 20030327 (200329)* GE 29 D21C003-02

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR IE IT KE LS LU
MC MW MZ NL OA PT SD SE SK SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DK DM
DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ

LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO
 RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM
 ZW

DE 10145338 C1 20030417 (200331) D21C003-02
 ADT WO 2003025280 A1 WO 2002-EP10245 20020912; DE 10145338 C1 DE 2001-10145338
 20010914

PRAI DE 2001-10145338 20010914
 IC ICM D21C003-02
 ICS C07G001-00; C08B001-00; C08B037-14; D21C001-00; D21C003-20;
 D21C005-00

AB WO2003025280 A UPAB: 20030505
 NOVELTY - Separation of **hemicellulose** from **hemicellulose**-containing **biomass**, especially wood.
 DETAILED DESCRIPTION - Separation of **hemicellulose** from **hemicellulose**-containing **biomass**, especially wood, and recovery of the **cellulose** by:
 (1) delignification of the **hemicellulose biomass**, separation of the extract and washing of the fibers;
 (2) treatment of the delignified **biomass** with ammonia; and
 (3) extraction of the process modified **biomass** with dilute aqueous lye at room or higher temperature to remove the **hemicellulose** from the remaining **cellulose**.
 An INDEPENDENT CLAIM is included for delignification of the **cellulose biomass** by:
 (a) dewatering the **biomass**;
 (b) impregnation of the dewatered **biomass** with an alkanolamine;
 (c) heat treatment of the impregnated **biomass** to break down the **lignin**; and
 (d) separation of the **lignin** breakdown product from the delignified **biomass**.
 USE - The method is useful for preparation of pharmaceutical Xylan, which is a sources of hydrolytic xylose and xylitol, and xylan polysulfate, which has a wide activity spectrum comparable with heparin.
 ADVANTAGE - The process is more cost-effective than previous processes, and provides for highly selective separation of **hemicellulose** from **hemicellulose**-containing **biomass**.
 Dwg.0/0

FS CPI
 FA AB
 MC CPI: F05-A02

L104 ANSWER 3 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 2003-744144 [70] WPIX
 CR 2003-730152 [69]
 DNC C2003-204428
 TI Conversion of **biomass** into blending component for petroleum-derived fuel by depolymerizing **lignin** feed material in aqueous solvent to provide first composition, and hydroprocessing first composition to provide second composition.
 DC A11 H06
 IN CHORNET, E; JOHNSON, D; SHABTAI, J S; ZMIERCZAK, W W
 PA (CHOR-I) CHORNET E; (JOHN-I) JOHNSON D; (SHAB-I) SHABTAI J S; (ZMIE-I) ZMIERCZAK W W
 CYC 1
 PI US 2003115792 A1 20030626 (200370)* 20 C10L005-00

ADT US 2003115792 A1 CIP of US 2001-972461 20011005, US 2002-80082 20020221
 PRAI US 2002-80082 20020221; US 2001-972461 20011005

IC ICM C10L005-00

AB US2003115792 A UPAB: 20031030

NOVELTY - A **biomass** is converted into a blending component for a petroleum-derived fuel by extracting a lignin-containing fraction in a reaction medium to provide a lignin feed material; depolymerizing the feed material in an aqueous solvent to provide a first composition with a depolymerized lignin; and hydroprocessing the first composition to provide a second composition with an aromatic hydrocarbon.

DETAILED DESCRIPTION - Conversion of a **biomass** into a blending component for a petroleum-derived fuel includes extracting a lignin-containing fraction in a reaction medium from the **biomass** to provide a lignin feed material; depolymerizing the lignin feed material in an aqueous solvent to provide a first composition comprising a depolymerized lignin; and hydroprocessing the first composition to provide a second composition comprising an aromatic hydrocarbon. The second composition provides a blending component for a petroleum or petroleum-derived fuel.

An INDEPENDENT CLAIM is also included for a method of enhancing the octane number of a petroleum or petroleum-derived fuel comprising combining the **biomass** derived blending component with the petroleum or petroleum-derived fuel at a ratio of 1:10-1:4 by volume to provide a blended fuel. The octane level of the petroleum-blended fuel is enhanced about 1-30% over the octane level of the petroleum or derived-derived based fuel without the blending component.

USE - For converting a **biomass** into a blending component (claimed) for a petroleum-derived fuel, e.g. gasolines.

ADVANTAGE - The process provides high yield and cost efficiency. It provides a veritable alternative future process for 7-10C alkylbenzenes as high-octane blending components for gasolines, and as basic feed materials for the chemical industry.

Dwg.0/5

FS CPI,

FA AB

MC CPI: A03-A; A10-E05C; A12-T03B; H06-B01; H06-D04

L104 ANSWER 4 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-730152 [69] WPIX

CR 2003-744144 [70]

DNC C2003-200756

TI Conversion of **biomass** into blending component for petroleum-derived fuel, comprises extracting lignin-containing fraction in reaction medium from **biomass** to provide lignin feed material.

DC A35 H06

IN CHORNET, E; JOHNSON, D; SHABTAI, J S; ZMIERCZAK, W W

PA (CHOR-I) CHORNET E; (JOHN-I) JOHNSON D; (SHAB-I) SHABTAI J S; (ZMIE-I) ZMIERCZAK W W

CYC 1

PI US 2003100807 A1 20030529 (200369)* 19 C07C007-177

ADT US 2003100807 A1 US 2001-972461 20011005

PRAI US 2001-972461 20011005

IC ICM C07C007-177

AB US2003100807 A UPAB: 20031030

NOVELTY - Conversion of **biomass** into blending component comprises extracting lignin-containing fraction in reaction medium from **biomass** to provide lignin feed material,

depolymerizing lignin feed material in aqueous solvent to provide first composition, and hydroprocessing first composition to provide second composition having aromatic hydrocarbon.

USE - For converting biomass into blending component for petroleum-derived fuel (claimed), e.g. gasoline.

ADVANTAGE - The invention enhances the octane level of petroleum or petroleum-derived fuels. It provides high-yield conversion of lignin.

Dwg.0/5

FS CPI

FA AB

MC CPI: A03-C02; A10-E05; A11-C03; A11-C07; A12-T03A; H06-B; H06-B01; H06-B06

L104 ANSWER 5 OF 25 MEDLINE on STN

AN 2003392651 MEDLINE

DN PubMed ID: 12930091

TI Bioethanol in India: recent past and emerging future.

AU Ghosh Purnendu; Ghose Tarun K

CS Birla Institute of Scientific Research, Statue Circle, Jaipur-302001, India.. pghosh@bisrjaipur.com

SO Advances in biochemical engineering/biotechnology, (2003) 85 1-27. Ref: 76

Journal code: 8307733. ISSN: 0724-6145.

CY Germany: Germany, Federal Republic of

DT Journal; Article; (JOURNAL ARTICLE)

General Review; (REVIEW)

(REVIEW, TUTORIAL)

LA English

FS Priority Journals

EM 200309

ED Entered STN: 20030822

Last Updated on STN: 20030928

Entered Medline: 20030926

AB There is renewed interest in bioethanol technology in view of its large potential as a transportation fuel. Bioethanol production based on lignocellulosic biomass, being the technology of the future, has been examined. The major issue is the production of ethanol at a competitive price. Biomass-based ethanol technologies are still evolving and the commercialization of this technology has to overcome various bottlenecks. Keeping this perspective in view, bioethanol technologies are analyzed in terms of feedstock availability, pretreatment strategies, efficient hydrolytic agents, availability of recombinant ethanologens and process economics with a focus on Indian research efforts. It provides indicators for research priorities to achieve these objectives.

CT *Bioreactors

*Biotechnology: IS, instrumentation

*Biotechnology: MT, methods

Biotechnology: TD, trends

*Cellulase: ME, metabolism

*Cellulose: ME, metabolism

Conservation of Energy Resources

Conservation of Natural Resources

*Ethanol: CS, chemical synthesis

*Ethanol: ME, metabolism

Fermentation

Hydrolysis

India

*Lignin: ME, metabolism

Models, Biological

RN 11132-73-3 (lignocellulose); 64-17-5 (Ethanol); 9004-34-6 (Cellulose);
 9005-53-2 (Lignin)
 CN EC 3.2.1.4 (Cellulase)

L104 ANSWER 6 OF 25 HCAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:368244 HCAPLUS
 DN 136:339941
 ED Entered STN: 18 May 2002
 TI Physical-chemical treatment of lignin containing biomass
 IN Severin, Blaine F.; Ponnampalam, Elankovan; McEowen, Jack
 PA Michigan Biotechnology Institute, USA
 SO PCT Int. Appl., 52 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM A23K
 CC 17-12 (Food and Feed Chemistry)
 Section cross-reference(s): 16, 18

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002037981	A2	20020516	WO 2001-US51086	20011026
	WO 2002037981	A3	20030206		
				W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG	
	AU 2002039756	A5	20020521	AU 2002-39756	20011026

PRAI US 2000-243882P P 20001027
 WO 2001-US51086 W 20011026

AB A method for increasing the digestibility of cellulose in biomass and for producing fermentation feedstocks and animal feeds from biomass is disclosed. The method comprises adding a basic material to biomass, and feeding the basic material and the biomass through an extruder. The biomass may be selected from agricultural byproducts such as bagasse, corn stover, straw, and hulls. The basic material may be selected from calcium carbonate, sodium bicarbonate, sodium carbonate, urea, ammonium hydroxide, calcium hydroxide, magnesium hydroxide, hydrated lime, sodium hydroxide, and potassium hydroxide. Preferably, the basic material is added to the biomass in a dry form, and most preferably includes urea. Also disclosed is an animal feed formed by adding a basic material and molasses to biomass, and an animal feed produced from biomass by mixing a portion of acid treated biomass with a portion of base treated biomass.

ST feed additive lignin cellulose biomass digestibility base
 IT Hay
 (alfalfa; phys.-chemical treatment of lignin containing biomass)
 IT Mashes
 (brewers' spent grain; phys.-chemical treatment of lignin containing biomass)
 IT Straw
 (buckwheat; phys.-chemical treatment of lignin containing biomass)
 IT Ketone bodies
 (disease, ketosis; phys.-chemical treatment of lignin containing biomass)
 IT Linum usitatissimum
 (flax straw; phys.-chemical treatment of lignin containing biomass)

IT Straw
 (flax; phys.-chemical treatment of lignin containing biomass)

IT Wastes
 (food-processing; phys.-chemical treatment of lignin containing biomass)

IT *Medicago sativa*
 (hay; phys.-chemical treatment of lignin containing biomass)

IT *Avena sativa*
Hordeum vulgare
Oryza sativa
 (hulls; phys.-chemical treatment of lignin containing biomass)

IT Lime (chemical)
 RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
 (hydrated; phys.-chemical treatment of lignin containing biomass)

IT Straw
 (oat; phys.-chemical treatment of lignin containing biomass)

IT Paralysis
 (parturient; phys.-chemical treatment of lignin containing biomass)

IT Bagasse
 Biomass
 Dairy cattle
 Dietary fiber
 Digestibility
 Extrusion, nonbiological
 Feed
 Feed additives
 Feeding experiment
 Fermentation
 Food preservatives
 Ions
 Molasses
 Poaceae
 Saccharification
 Stomach content, ruminant
 Straw
 Wheat straw
 (phys.-chemical treatment of lignin containing biomass)

IT Mineral elements, biological studies
 Proteins
 RL: BSU (Biological study, unclassified); BIOL (Biological study)
 (phys.-chemical treatment of lignin containing biomass)

IT Acids, biological studies
 RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
 (phys.-chemical treatment of lignin containing biomass)

IT Bases, biological studies
 RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
 (phys.-chemical treatment of lignin containing biomass)

IT Carbohydrates, biological studies
 RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
 (phys.-chemical treatment of lignin containing biomass)

IT Straw
 (rice; phys.-chemical treatment of lignin containing biomass)

IT Straw
 (rye; phys.-chemical treatment of lignin containing biomass)

IT *Zea mays*
 (stover corn; phys.-chemical treatment of lignin containing biomass)

IT *Avena sativa*
Fagopyrum esculentum
Oryza sativa
Secale cereale
 (straw; phys.-chemical treatment of lignin containing biomass)

- IT Food processing
Gossypium hirsutum
 (wastes; phys.-chemical treatment of lignin containing biomass)
- IT 7439-95-4, Magnesium, biological studies 7440-09-7, Potassium, biological studies 7440-23-5, Sodium, biological studies 7440-70-2, Calcium, biological studies 7723-14-0, Phosphorus, biological studies
 RL: BSU (Biological study, unclassified); BIOL (Biological study)
 (phys.-chemical treatment of lignin containing biomass)
- IT 9004-34-6, Cellulose, biological studies 9005-53-2, Lignin, biological studies 11132-73-3, Lignocellulose
 RL: BSU (Biological study, unclassified); FFD (Food or feed use); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process); USES (Uses)
 (phys.-chemical treatment of lignin containing biomass)
- IT 57-13-6, Urea, biological studies 64-19-7, Acetic acid, biological studies 64-19-7D, Acetic acid, salts 65-85-0, Benzoic acid, biological studies 65-85-0D, Benzoic acid, salts 79-09-4, Propionic acid, biological studies 79-09-4D, Propionic acid, salts 110-44-1, Sorbic acid 110-44-1D, Sorbic acid, salts 144-55-8, Sodium bicarbonate, biological studies 471-34-1, Calcium carbonate, biological studies 497-19-8, Sodium carbonate, biological studies 1305-62-0, Calcium hydroxide, biological studies 1309-42-8, Magnesium hydroxide 1310-58-3, Potassium hydroxide, biological studies 1310-73-2, **Sodium hydroxide**, biological studies 1336-21-6, Ammonium hydroxide 7647-01-0, Hydrochloric acid, biological studies 7664-38-2, Phosphoric acid, biological studies 7664-41-7, Ammonia, biological studies 7664-93-9, Sulfuric acid, biological studies 7697-37-2, Nitric acid, biological studies 9012-54-8, Cellulase 17341-25-2, Sodium ion, biological studies
 RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
 (phys.-chemical treatment of lignin containing biomass)
- IT 64-17-5P, Ethanol, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (phys.-chemical treatment of lignin containing biomass)

L104 ANSWER 7 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 2002-698762 [75] WPIX
 DNC C2002-197955
 TI Production of xylose from **lignocellulosic** feed stock e.g. wheat straw, involves leaching feed stock, disrupting fiber structure and hydrolyzing **hemicellulose** and **cellulose** in leached feed stock after removing leachate.
 DC D16 D17 E17 H06
 IN ANAND, V; GRIFFIN, R; MOTT, C; NICHOLSON, C; TOLAN, J S
 PA (IOGE-N) IOGEN ENERGY CORP; (IOGE-N) IOGEN BIO PROD CORP
 CYC 101
 PI WO 2002070753 A2 20020912 (200275)* EN 61 C13K001-02
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
 NL OA PT SD SE SL SZ TR TZ UG ZM ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
 DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
 KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT
 RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM
 ZW
 EP 1364072 A2 20031126 (200380) EN C13K001-02
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI TR
 AU 2002234469 A1 20020919 (200433) C13K001-02
 ADT WO 2002070753 A2 WO 2002-CA244 20020227; EP 1364072 A2 EP 2002-701138

20020227, WO 2002-CA244 20020227; AU 2002234469 A1 AU 2002-234469 20020227
 FDT EP 1364072 A2 Based on WO 2002070753; AU 2002234469 A1 Based on WO
 2002070753

PRAI US 2001-272353P 20010228

IC ICM C13K001-02

ICS C12P007-10; C13K013-00

AB WO 2002070753 A UPAB: 20021120

NOVELTY - **Lignocellulosic** feed stock (LCF) with greater than 20 weight/weight% (w/w%) **cellulose** is leached by contacting with aqueous solution(s) for above 2 minutes to produce leached feed stock (LF) and leachate (L). LF is reacted under conditions which disrupt fiber structure and hydrolyze a portion of **hemicellulose** and **cellulose** in LF after removing L, to produce composition of xylose and pretreated feed stock.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for:

- (1) the pre-treated feed stock;
- (2) the **lignocellulosic** composition;
- (3) production of **ethanol** from LCF by following steps

included in the production of composition comprising xylose and pretreated (in which:

- (a) LF is acidified to pH 0.5-3;
- (b) the composition is treated with **cellulose** for hydrolyzing the cellulase in the pretreated feed stock to glucose;
- (c) a sugar solution comprising xylose and glucose is produced and
- (d) the sugar solution is fermented to produce **ethanol**;
- (4) preparation of LCF which involves preconditioning LCF, incubating in a leaching bath (LB), and crushing to produce a pressate and a solid feed stock; and
- (5) LCF processing system comprising:

(a) a pre-conditioner capable of receiving LCF from a handling device (the pre-conditioner is in communication with a steam source for heating LCF);

- (b) a transfer device-I for conveying LCF within and from the pre-conditioner to the LB;
- (c) a transfer device-II for mixing LCF within the LB and conveying LCF from LB to a press;
- (d) a transfer device-III for conveying the pressed LCF from the press to a next leach stage; and
- (e) a multi-press for producing processed LCF.

USE - For the conversion of LCF into sugars and the subsequent conversion of sugars to **ethanol**. For the processing of **biomass**. The protein recovered from LCF is used for animal feed.

ADVANTAGE - The method enables production of high yields of **ethanol** (300-340 l **ethanol** per metric ton **biomass**). The steam and acid treatments denatures protein within LCF, and hydrolyzes labile amino acids, e.g. lysine, that are important for high quality animal feeds. As the protein is recovered from the processed LCF, prior to denaturing process, the protein is of a high quality, and can be used for animal feed.

DESCRIPTION OF DRAWING(S) - The figure shows a graphical representation showing the amount of acid required to titrate water (dashed line) versus a leachate (solid line).

Dwg.1/8

FS CPI

FA AB; GI; DCN

MC CPI: D05-A04; D05-B; D05-B03; D05-C; D05-H04; D05-H08; D05-H13; E10-A07;
 E10-E04E2; E11-C; E11-G03; E11-M; E11-Q01; H06-B

L104 ANSWER 8 OF 25 MEDLINE on STN
 AN 2002080576 MEDLINE
 DN PubMed ID: 11807763
 TI Fast and efficient alkaline peroxide treatment to enhance the enzymatic digestibility of steam-exploded softwood substrates.
 AU Yang Bin; Boussaid Abdel; Mansfield Shawn D; Gregg David J; Saddler John N
 CS Faculty of Forestry, Forest Products Biotechnology, University of British Columbia, Vancouver, Canada.
 SO Biotechnology and bioengineering, (2002 Mar 20) 77 (6) 678-84.
 Journal code: 7502021. ISSN: 0006-3592.
 CY United States
 DT Journal; Article; (JOURNAL ARTICLE)
 LA English
 FS Priority Journals
 EM 200205
 ED Entered STN: 20020128
 Last Updated on STN: 20020518
 Entered Medline: 20020517
 AB The enzymatic digestibility of steam-exploded Douglas-fir wood chips (steam exploded at 195 degrees C, 4.5 min, and 4.5% (w/w) SO₂) was significantly improved using an optimized alkaline peroxide treatment. Best hydrolysis yields were attained when the steam-exploded material was post-treated with 1% hydrogen peroxide at pH 11.5 and 80 degrees C for 45 min. This alkaline peroxide treatment was applied directly to the water-washed, steam-exploded material eliminating the need for independent alkali treatment with 0.4% NaOH, which has been traditionally used to post-treat wood samples to try to remove residual lignin. Approximately 90% of the lignin in the original wood was solubilized by this novel procedure, leaving a cellulose-rich residue that was completely hydrolyzed within 48 h, using an enzyme loading of 10 FPU/g cellulose. About 82% of the originally available polysaccharide components of the wood could be recovered. The 18% of the carbohydrate that was not recovered was lost primarily to sugar degradation during steam explosion.
 Copyright 2002 John Wiley & Sons, Inc. Biotechnol Bioeng 77: 678-684, 2002; DOI 10.1002/bit.10159
 CT Check Tags: Support, Non-U.S. Gov't
 Cellulose: CH, chemistry
 Ethanol: CS, chemical synthesis
 Hydrogen-Ion Concentration
 Hydrolysis
 Lignin: CH, chemistry
 *Peroxides: CH, chemistry
 *Pseudotsuga: EN, enzymology
 Steam
 *Wood
 RN 64-17-5 (Ethanol); 9004-34-6 (Cellulose); 9005-53-2 (Lignin)
 CN 0 (Peroxides)

L104 ANSWER 9 OF 25 HCAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:973984 HCAPLUS
 DN 140:256120
 ED Entered STN: 15 Dec 2003
 TI Bio-refinery of lignocellulosic materials for ethanol production. IV. Manufacture of high value by-products for improvement of process economic feasibility
 AU Li, Jiebing; Lennholm, Helena; Henriksson, Gunnar; Gellerstedt, Goran
 CS Department of Pulp and Paper Chemistry and Technology, Royal Institute of Technology, KTH, Stockholm, SE-100 44, Swed.
 SO Emerging Technologies of Pulping & Papermaking, Proceedings of the

International Symposium on Emerging Technologies of Pulping & Papermaking,
 2nd, Guangzhou, China, Oct. 9-11, 2002 (2002), 82-90. Editor(s): Liu,
 Huanbin; Zhan, Huaiyu; Xie, Yimin. Publisher: South China University of
 Technology Press, Guangzhou, Peop. Rep. China.

CODEN: 69EVPX; ISBN: 7-5623-1886-7

DT Conference

LA English

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 7, 10, 17, 43, 45

AB A biomass-to-ethanol process converts mainly cellulose into ethanol. If the ethanol is the sole product, however, such a process may not be economically viable. It is demanded that the process includes well-suited and efficient sepn. and valuable modifications of other wood components from the raw materials. Extraction of lignin after steam explosion of aspen wood chips was evaluated followed by peroxide oxidation, sulfomethylation or sulfoethylation of the isolated lignin. Separation of hemicellulose as xylose was also examined after enzymic hydrolysis and fermentation steps. The lignin extraction and the xylose separation were rather efficient. The oxidation of lignin

increased the carboxylic groups in the structure by 21% and the sulfonations maintained the high mol. weight and created 1.8-2.2 mmol/g of sulfonate groups in the lignin. Possessing a similar amount of sulfonate groups as com. lignosulfonates, the sulfonated lignins are expected to have the same capabilities as the latter for practical applications. During the step for hydrolysis of cellulose, xylan was simultaneously hydrolyzed into xylose and in the fermentation of glucose, the presence of xylose gave no harmful influence to the fermentation. Evaporation of ethanol

after

fermentation will result easily in a rather pure solution of xylose. The isolated

aspen lignin was subjected to either peroxide oxidation, sulfornethylation or sulfoethylation. The peroxide oxidation increased the carboxylic groups in the lignin by 21%. The sulfonations maintained the high mol. weight of the lignin and created 1.8-2.2 mmol/g of sulfonate groups, a similar amount of sulfonate groups as com. lignosulfonates. The authors thus expect the sulfonated lignins to have the same capabilities as com. lignosulfonates for practical applications.

ST biomass lignocellulosic enzymic hydrolysis fermn ethanol glucose xylose engineering

IT Fermentation

(aerobic; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT Wood

(aspen, chips, steam exploded; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT Hydrolysis

(enzymic; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT Wood

(fibers; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT Extraction

Oxidation

Yeast

(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol

- production)
- IT Alcohols, reactions
Phenols, reactions
RL: FMU (Formation, unclassified); NPO (Natural product occurrence); RCT (Reactant); BIOL (Biological study); FORM (Formation, nonpreparative); OCCU (Occurrence); RACT (Reactant or reagent)
(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT Ethylation
(sulfoethylation; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT Methylation
(sulfomethylation; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT Functional groups
(sulfonate group; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT Carboxylic acids, reactions
RL: FMU (Formation, unclassified); NPO (Natural product occurrence); RCT (Reactant); BIOL (Biological study); FORM (Formation, nonpreparative); OCCU (Occurrence); RACT (Reactant or reagent)
(traces; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT 50-99-7P, D-Glucose, preparation
RL: BCP (Biochemical process); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation); PROC (Process)
(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT 64-17-5P, Ethanol, preparation
RL: BMF (Bioindustrial manufacture); BIOL (Biological study); PREP (Preparation)
(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT 9012-54-8, Celluclast
RL: CAT (Catalyst use); USES (Uses)
(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT 497-19-8, Sodium carbonate, uses 1310-73-2, Sodium hydroxide, uses
RL: CAT (Catalyst use); MOA (Modifier or additive use); USES (Uses)
(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT 90-05-1D, Guaiacol, derivs. 91-10-1D, Syringol, derivs. 1076-38-6D, 4-Coumarinol, derivs.
RL: FMU (Formation, unclassified); NPO (Natural product occurrence); RCT (Reactant); BIOL (Biological study); FORM (Formation, nonpreparative); OCCU (Occurrence); RACT (Reactant or reagent)
(manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)
- IT 9004-34-6, Cellulose, reactions 9014-63-5, Xylan 9034-32-6,

Hemicellulose

RL: NPO (Natural product occurrence); RCT (Reactant); BIOL (Biological study); OCCU (Occurrence); RACT (Reactant or reagent)
 (manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT 123-91-1, Dioxane, uses

RL: NUU (Other use, unclassified); USES (Uses)
 (manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT 9005-53-2DP, Lignin, sulfomethylated and sulfoethylated

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
 (manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT 9005-53-2, Lignin, reactions

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
 (manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT 58-86-6P, Xylose, preparation

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); REM (Removal or disposal); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
 (manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT 870-72-4, Sodium hydroxymethylsulfonate 7722-84-1, Hydrogen peroxide, reactions 15484-44-3, Sodium 2-chloroethanesulfonate

RL: RCT (Reactant); RACT (Reactant or reagent)
 (manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

IT 498-00-0, 4-Hydroxy-3-methoxybenzyl alcohol

RL: RCT (Reactant); RACT (Reactant or reagent)
 (model lignin structure for sulfoalkylation; manufacture of high value byproducts for improvement of process economic feasibility of bio-refinery of lignocellulosic materials for ethanol production)

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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L104 ANSWER 10 OF 25 HCAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:323608 HCAPLUS
 DN 137:313372
 ED Entered STN: 01 May 2002
 TI Chemical pretreatments of corn stover for enhancing enzymatic digestibility
 AU Varga, Eniko; Szengyel, Zsolt; Reczey, Kati
 CS Department of Agricultural Chemical Technology, Budapest University of Technology and Economics, Budapest, H1521, Hung.
 SO Applied Biochemistry and Biotechnology (2002), 98-100(Biotechnology for Fuels and Chemicals), 73-87
 CODEN: ABIBDL; ISSN: 0273-2289
 PB Humana Press Inc.
 DT Journal
 LA English
 CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 7
 AB Corn stover, the most abundant agricultural residue in Hungary, is a potential raw material for the production of fuel ethanol as a result of its high content of carbohydrates, but a pretreatment is required for its efficient hydrolysis. In this article, we describe the results using various chems. such as dilute H₂SO₄, HCl, and NaOH sep. as well as consecutively under relative mild conditions (120°C, 1 h). Pretreatment with 5% H₂SO₄ or 5% HCl solubilized 85% of the hemicellulose fraction, but the enzymic conversion of pretreated materials increased only two times compared to the untreated corn stover. Applying acidic pretreatment following a 1-d soaking in base achieved enzymic conversion that was nearly the theor. maximum (95.7%). Pretreatment with 10% NaOH decreased the lignin fraction >95%, increased the enzymic conversion more than four times, and gave a 79.4% enzymic conversion. However, by increasing the reaction time, the enzymic degradability could also be increased significantly, using a less concentrated base. When the time of pretreatment was increased three times (0.5% NaOH at 120°C), the amount of total released sugars was 47.9 g from 100 g (dry matter) of untreated corn stover.
 ST biomass corn pretreatment ethanol prodn acid alk enzyme hydrolysis; corn stover cellulose enzymic hydrolysis glucose sugar release
 IT Hydrolysis
 (acid; chemical pretreatments of corn stover for enhancing enzymic digestibility)
 IT Biomass
 Saccharification
 (chemical pretreatments of corn stover for enhancing enzymic digestibility)
 IT Hydrolysis
 (enzymic; chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT **Zea mays**
 (stover corn; chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT 50-99-7, Glucose, processes 9001-22-3, Novozyme 188 9012-54-8,
 Celluclast
 RL: BCP (Biochemical process); BIOL (Biological study); PROC (Process)
 (chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT **64-17-5P, Ethanol, preparation**
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT 9004-34-6, Cellulose, processes 9005-53-2, Lignin, processes
 RL: BCP (Biochemical process); BIOL (Biological study);
 PROC (Process)
 (corn stover, hydrolysis; chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT 9034-32-6, Hemicellulose
 RL: BCP (Biochemical process); RCT (Reactant); BIOL (Biological study);
 PROC (Process); RACT (Reactant or reagent)
 (corn stover, hydrolysis; chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT 7664-93-9, Sulfuric acid, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (dilute, pretreatment; chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT **1310-73-2, Sodium hydroxide, processes**
 7647-01-0, Hydrochloric acid, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (pretreatment; chemical pretreatments of corn stover for enhancing enzymic digestibility)

IT 1305-62-0, Calcium hydroxide, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (pretreatment; chemical pretreatments of corn stover for enhancing enzymic digestibility)

RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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L104 ANSWER 11 OF 25 HCPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:119908 HCPLUS
 DN 138:400616
 ED Entered STN: 16 Feb 2003
 TI Preparation of cellulose from oil palm empty fruit bunches via ethanol digestion: effect of acid and alkali catalysts
 AU Aziz, Astimar Abdul; Husin, Mohamad; Mokhtar, Anis
 CS Malaysian Palm Oil Board, Kuala Lumpur, 50720, Malay.
 SO Journal of Oil Palm Research (2002), 14(1), 9-14
 CODEN: JOPRFO; ISSN: 1511-2780
 PB Malaysian Palm Oil Board
 DT Journal
 LA English
 CC 17-2 (Food and Feed Chemistry)
 AB Ethanol digestion of oil palm empty fruit bunches (OPEFB) fibers at a temperature between 165°C - 180°C for 2 h and at a solid-to-liquid ratio of 10:1, ethanol-to-water ratio of 1:1, and with or without 10% 1 N HCl and 1.25 M NaOH as catalysts was studied in order to prepare cellulose via ethanol pulping. The pulp produced was studied for yield, moisture content, solubility in cold/hot water and 1% NaOH, lignin, holocellulose and a-cellulose content. The highest yield of pulp (57%, oven dried weight basis) was from OPEFB fibers digested at 170°C for 2 h without addition of catalyst, whereas OPEFB fibers digested at 175°C for 2 h with acid catalyst gave the lowest yield of 45% (oven dried weight basis) pulp. Higher cooking temperature gave lower yield of pulp since the reaction hydrolyzed out the hemicellulose, lignin and part of the cellulose. The reactions at 165°C, 170°C and 175°C with acid catalyst produced 56%, 50% and 45% of pulp yield, resp. It was found that a temperature of 180°C with or without catalyst was too high for pulping because it totally digested the fiber into a viscous soluble pulp. On the effect of catalysts, acid catalyst was found to enhance the pulping of OPEFB fibers. Without the acid catalyst, at temperature of 165°C, the fibers could not be fully cooked and would still be in the fibrous form. Reactions at 170°C and 175°C without catalyst gave 57% and 55% yield of pulp, resp. whereas with acid catalyst gave 50% and 45% yield of pulp resp. The base catalyst could only fully pulp the OPEFB fibers at a temperature of 175°C, but the fibers dissolved at temperature 180°C. Pulp produced at 175°C for 2 h with 10% 1.25 M NaOH gave the best quality pulp, which contained lowest lignin and highest holocellulose at 8.2% and 91.8% (based on the dry weight of pulp), resp. The maximum yield of a-cellulose (isolated from the pulp) also was obtained from OPEFB digested with alkali catalyst at 175°C for 2 h (64.3% based from dry weight of pulp; 34.1% based on dry weight of OPEFB).
 ST cellulose prepn ethanol acid alkali catalyst
 IT Wastes
 (agricultural; effect of acid and alkali catalysts during preparation of cellulose from oil palm empty fruit bunches via ethanol digestion)
 IT Pulping
 (effect of acid and alkali catalysts during preparation of cellulose from oil palm empty fruit bunches via ethanol digestion)
 IT 64-17-5, Ethanol, processes 1310-73-2, Sodium hydroxide, processes 7647-01-0, Hydrochloric acid, processes RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (effect of acid and alkali catalysts during preparation of cellulose from oil palm empty fruit bunches via ethanol digestion)

IT 9004-34-6P, Cellulose, preparation
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)
 (effect of acid and alkali catalysts during preparation of cellulose from oil palm empty fruit bunches via ethanol digestion)

IT 8064-26-4, Holocellulose 9005-53-2, Lignin, processes
 RL: REM (Removal or disposal); PROC (Process)
 (effect of acid and alkali catalysts during preparation of cellulose from oil palm empty fruit bunches via ethanol digestion)

RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L104 ANSWER 12 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 2002-085664 [12] WPIX

DNC C2002-026386

TI Manufacture of fuel from biomass, involves grinding biomass, adding water to form slurry, decomposing/saccharifying polysaccharide in biomass by maintaining at sub- or super-critical state of water and fermenting.

DC D16 H06

PA (MITO) MITSUBISHI JUKOGYO KK

CYC 1

PI JP 2001262162 A 20010926 (200212)* 5 C10L001-02

ADT JP 2001262162 A JP 2000-72735 20000315

PRAI JP 2000-72735 20000315

IC ICM C10L001-02

ICS C10L003-00; C12N001-16; C12N001-20; C12N001-22; C12P005-02; C12P007-08

AB JP2001262162 A UPAB: 20020221

NOVELTY - Biomass is collected and ground. Water is added to the ground biomass to form a slurry. The polysaccharide contained in the biomass is decomposed and saccharified by maintaining the

slurry at subcritical or super-critical state of water. The obtained liquid is fermented after an appropriate time to obtain fuel.

USE - For manufacturing fuel such as **ethanol** and methane, from **biomass**.

ADVANTAGE - The method enables to manufacture fuel from **biomass**. The extraction-separation of fuel is made easy with less residue and there is no need for heat-processing for gelatinization.

DESCRIPTION OF DRAWING(S) - The figure shows the flow chart of **ethanol** production process.

Dwg.1/1

FS CPI
FA AB; GI
MC CPI: D05-A; D05-C13; H06-A04

L104 ANSWER 13 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 2001:93738 BIOSIS
 DN PREV200100093738
 TI Comparison of SHF and SSF processes for the bioconversion of steam-exploded wheat straw.
 AU Alfani, F. [Reprint author]; Gallifuoco, A.; Saporosi, A.; Spera, A.; Cantarella, M.
 CS Chemical Engineering and Materials, University of L'Aquila, Monteluco di Roio, L'Aquila, 67040, Italy
 SO Journal of Industrial Microbiology and Biotechnology, (October, 2000) Vol. 25, No. 4, pp. 184-192. print.
 ISSN: 1367-5435.
 DT Article
 LA English
 ED Entered STN: 21 Feb 2001
 Last Updated on STN: 12 Feb 2002
 AB Two processes for ethanol production from wheat straw have been evaluated - separate hydrolysis and fermentation (SHF) and simultaneous saccharification and fermentation (SSF). The study compares the ethanol yield for biomass subjected to varying steam explosion pretreatment conditions: temperature and time of pretreatment was 200degreeC or 217degreeC and at 3 or 10 min. A rinsing procedure with water and NaOH solutions was employed for removing lignin residues and the products of **hemicellulose** degradation from the biomass, resulting in a final structure that facilitated enzymatic hydrolysis. Biomass loading in the bioreactor ranged from 25 to 100 g l-1 (dry weight). The enzyme-to-biomass mass ratio was 0.06. Ethanol yields close to 81% of theoretical were achieved in the two-step process (SHF) at hydrolysis and fermentation temperatures of 45degreeC and 37degreeC, respectively. The broth required addition of nutrients. Sterilisation of the biomass hydrolysate in SHF and of reaction medium in SSF can be avoided as can the use of different buffers in the two stages. The optimum temperature for the single-step process (SSF) was found to be 37degreeC and ethanol yields close to 68% of theoretical were achieved. The SSF process required a much shorter overall process time (apprxeq30 h) than the SHF process (96 h) and resulted in a large increase in ethanol productivity (0.837 g l-1 h-1 for SSF compared to 0.313 g l-1 h-1 for SHF).
 CC Biochemistry studies - General 10060
 Biochemistry studies - Carbohydrates 10068
 Food microbiology - General and miscellaneous 39008
 IT Major Concepts
 Bioprocess Engineering; Methods and Techniques
 IT Chemicals & Biochemicals
 ethanol: production; hemicellulose: degradation

products; lignin: residues; sodium hydroxide [NaOH]: rinsing agent; water: rinsing agent

IT Methods & Equipment
 biomass hydrolysate sterilisation [biomass hydrolysate sterilization]:
 disinfection method; bioreactor: industrial equipment; enzymatic hydrolysis: production method; separate hydrolysis and fermentation [SHF]: production method; simultaneous saccharification and fermentation [SSF]: production method; steam-exploded wheat straw bioconversion: synthetic method

IT Miscellaneous Descriptors
 biomass loading; enzyme-to-biomass mass ratio; lignocellulosic biomass; nutrient addition; steam explosion pretreatment conditions: optimum temperature, time

RN 64-17-5 (ethanol)
 9034-32-6 (hemicellulose)
 9005-53-2 (lignin)
 1310-73-2 (sodium hydroxide)
 1310-73-2 (NaOH)
 7732-18-5 (water)

L104 ANSWER 14 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 2001:151986 BIOSIS
 DN PREV200100151986
 TI Simultaneous saccharification and cofermentation of peracetic acid-pretreated biomass.
 AU Teixeira, Lincoln C. [Reprint author]; Linden, James C.; Schroeder, Herbert A.
 CS Department of Biotechnology, Fundacao Centro Tecnologico de Minas Gerais-CETEC, Av. Jose Candido da Silveira 2000, CEP 31170-000, Belo Horizonte, MG, Brazil
 lct@cetec.br
 SO Applied Biochemistry and Biotechnology, (Spring, 2000) Vol. 84-86, pp. 111-127. print.
 CODEN: ABIBDL. ISSN: 0273-2289.
 DT Article
 LA English
 ED Entered STN: 28 Mar 2001
 Last Updated on STN: 15 Feb 2002
 AB Previous work in our laboratories has demonstrated the effectiveness of peracetic acid for improving enzymatic digestibility of lignocellulosic materials. The use of dilute alkali solutions as a pre-pretreatment prior to peracetic acid lignin oxidation increased carbohydrate hydrolysis yields in a synergistic as opposed to additive manner. Deacetylation of xylan is easily achieved using dilute alkali solutions under mild conditions. In this article, we evaluate the effectiveness of peracetic acid combined with an alkaline pre-pretreatment through simultaneous saccharification and cofermentation (SSCF) or pretreated hybrid poplar wood and sugar cane bagasse. Respective ethanol yields of 92.8 and 91.9% of theoretical are achieved using 6% NaOH /15% peracetic acid-pretreated substrates and recombinant Zymomonas mobilis CP4/pZB5. Reduction of acetyl groups of the lignocellulosic materials is demonstrated following alkaline pre-pretreatments. Such processing may be helpful in reducing peracetic acid requirements. The influence of deacetylation is more significant in combined pretreatments using lower peracetic acid loadings.
 CC Food microbiology - General and miscellaneous 39008
 Biochemistry studies - General 10060
 Biochemistry studies - Carbohydrates 10068

IT Enzymes - General and comparative studies: coenzymes 10802
 Physiology and biochemistry of bacteria 31000
 IT Major Concepts
 Bioprocess Engineering; Methods and Techniques
 IT Chemicals & Biochemicals
 carbohydrates: hydrolysis yields; celluloses: conversions, treatments; enzymes: uses; ethanol: production; peracetic acid: uses
 IT Methods & Equipment
 HPLC [high performance liquid chromatography]: analytical method, liquid chromatography; peracetic acid biomass pretreatment: Preparatory and General Laboratory Techniques, applications, biomass treatment method
 IT Miscellaneous Descriptors
 biotechnology; hydrolysis reactions: applications; industrial alcohol production; peracetic acid-pretreated biomass: cofermentation, saccharification; product yields
 ORGN Classifier
 Facultatively Anaerobic Gram-Negative Rods 06700
 Super Taxa
 Eubacteria; Bacteria; Microorganisms
 Organism Name
 Zymomonas mobilis
 Taxa Notes
 Bacteria, Eubacteria, Microorganisms
 RN 9004-34-6 (celluloses)
 64-17-5 (ethanol)
 79-21-0 (peracetic acid)
 64-17-5 (ethanol)
 79-21-0 (peracetic acid)

L104 ANSWER 15 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 1999-214502 [18] WPIX
 DNC C1999-063186
 TI Process for conversion of lignin to reformulated hydrocarbon gasoline.
 DC E19 H04
 IN CHORNET, E; SHABTAI, J S; ZMIERCZAK, W W
 PA (UTAH) UNIV UTAH RES FOUND
 CYC 23
 PI WO 9910450 A1 19990304 (199918)* EN 31 C10G001-00
 RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
 W: BR CA JP KR
 US 5959167 A 19990928 (199947) C10G001-00
 ADT WO 9910450 A1 WO 1998-US17539 19980825; US 5959167 A Provisional US 1997-56785P 19970825, US 1998-136336 19980819
 PRAI US 1998-136336 19980819; US 1997-56785P 19970825
 IC ICM C10G001-00
 ICS C07C001-00; C10G001-06
 AB WO 9910450 A UPAB: 20011203
 NOVELTY - Lignin is base-catalysed in the presence of a supercritical alcohol to depolymerise and is then hydroprocessed to a reformulated hydrocarbon.
 USE - For production of gasoline from biomass, specifically lignin.
 ADVANTAGE - Reduces polluting and carcinogenic byproducts of conventional, high aromatic component content hydrocarbons.
 Dwg. 0/4
 FS CPI

FA AB; DCN
MC CPI: E10-J02D3; E33-A03; E33-H; E34-D01; H04-D

L104 ANSWER 16 OF 25 MEDLINE on STN
AN 2000025502 MEDLINE
DN PubMed ID: 10557161
TI Fuel ethanol after 25 years.
AU Wheals A E; Basso L C; Alves D M; Amorim H V
CS Department of Biology and Biochemistry, University of Bath, Bath, UK BA2
7AY.. bssaew@bath.ac.uk
SO Trends in biotechnology, (1999 Dec) 17 (12) 482-7.
Journal code: 8310903. ISSN: 0167-7799.
CY ENGLAND: United Kingdom
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199912
ED Entered STN: 20000114
Last Updated on STN: 20000114
Entered Medline: 19991230
AB After 25 years, Brazil and North America are still the only two regions that produce large quantities of fuel ethanol, from sugar cane and maize, respectively. The efficiency of ethanol production has steadily increased and valuable co-products are produced, but only tax credits make fuel ethanol commercially viable because oil prices are at an all-time low. The original motivation for fuel-ethanol production was to become more independent of oil imports; now, the emphasis is on its use as an oxygenated gasoline additive. There will only be sufficient, low-cost ethanol if lignocellulose feedstock is also used.
CT Check Tags: Support, Non-U.S. Gov't
Carbohydrates: ME, metabolism
Cellulase: ME, metabolism
Cellulose: ME, metabolism
Environmental Pollution: PC, prevention & control
*Ethanol: CS, chemical synthesis
*Ethanol: ME, metabolism
*Fermentation
Fuel Oils: EC, economics
Lignin: ME, metabolism
Pentoses: ME, metabolism
Zea mays: CH, chemistry
RN 11132-73-3 (lignocellulose); 64-17-5 (Ethanol); 9004-34-6 (Cellulose);
9005-53-2 (Lignin)
CN 0 (Carbohydrates); 0 (Pentoses); EC 3.2.1.4 (Cellulase)

L104 ANSWER 17 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 1999:362670 BIOSIS
DN PREV199900362670
TI Comparison of different methods for the detoxification of lignocellulose hydrolyzates of spruce.
AU Larsson, Simona; Reimann, Anders; Nilvebrant, Nils-Olof; Jonsson, Leif J.
[Reprint author]
CS Department of Applied Microbiology, Lund University/Lund Institute of
Technology, SE-221 00, Lund, Sweden
SO Applied Biochemistry and Biotechnology, (Spring, 1999) Vol. 77-79, No. 0,
pp. 91-103. print.
CODEN: ABIBDL. ISSN: 0273-2289.

DT Article
 LA English
 ED Entered STN: 2 Sep 1999
 Last Updated on STN: 2 Sep 1999
 AB This study describes different detoxification methods to improve both cell growth and ethanol production by Baker's yeast, *Saccharomyces cerevisiae*. A dilute-acid hydrolyzate of spruce was used for the all detoxification methods tested. The changes in the concentrations of fermentable sugars and three groups of inhibitory compounds-aliphatic acids, furan derivatives, and phenolic compounds-were determined and the fermentability of the detoxified hydrolyzate was assayed. The applied detoxification methods included: treatment with alkali (sodium hydroxide or calcium hydroxide); treatment with sulfite (0.1% (w/v) or 1% (w/v) at pH 5.5 or 10); evaporation of 10% or 90% of the initial volume; anion exchange (at pH 5.5 or 10); enzymatic detoxification with the phenoloxidase laccase; and detoxification with the filamentous fungus *Trichoderma reesei*. Anion exchange at pH 5.5 or 10, treatment with laccase, treatment with calcium hydroxide, and treatment with *T. reesei* were the most efficient detoxification methods. Evaporation of 10% of the initial volume and treatment with 0.1% sulfite were the least efficient detoxification methods. Treatment with laccase was the only detoxification method that specifically removed only one group of the inhibitors, namely phenolic compounds. Anion exchange at pH 10 was the most efficient method for removing all three major groups of inhibitory compounds; however, it also resulted in loss of fermentable sugars.
 CC Biochemistry methods - Carbohydrates 10058
 Biophysics - Methods and techniques 10504
 Biophysics - Molecular properties and macromolecules 10506
 Toxicology - General and methods 22501
 IT Major Concepts
 Biochemistry and Molecular Biophysics; Methods and Techniques;
 Toxicology
 IT Chemicals & Biochemicals
 ethanol: production; laccase: catalyst;
 lignocellulose: hydrolyzate detoxification
 IT Methods & Equipment
 carbohydrate detoxification method: Synthesis/Modification techniques,
 processing method; fermentation culture: cell culture techniques,
 culture method; high performance liquid chromatography: analytical
 method, liquid chromatography
 ORGN Classifier
 Ascomycetes 15100
 Super Taxa
 Fungi; Plantae
 Organism Name
 Saccharomyces cerevisiae
 Taxa Notes
 Fungi, Microorganisms, Nonvascular Plants, Plants
 ORGN Classifier
 Coniferopsida 25102
 Super Taxa
 Gymnospermae; Spermatophyta; Plantae
 Organism Name
 spruce
 Taxa Notes
 Gymnosperms, Plants, Spermatophytes, Vascular Plants
 ORGN Classifier
 Fungi Imperfecti or Deuteromycetes 15500
 Super Taxa
 Fungi; Plantae

Organism Name

Trichoderma reesei

Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

RN 64-17-5 (ethanol)

80498-15-3 (laccase)

11132-73-3 (lignocellulose)

L104 ANSWER 18 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 1999:362664 BIOSIS

DN PREV199900362664

TI Alkaline and peracetic acid pretreatments of biomass for ethanol production.

AU Teixeira, Lincoln C. [Reprint author]; Linden, James C.; Schroeder, Herbert A.

CS Setor de Biotecnologia, Fundacao Centro Tecnologico de Minas Gerais-CETEC, Av. Jose Candido da Silveira 2000, CEP 31170-000, Belo Horizonte, MG, Brazil

SO Applied Biochemistry and Biotechnology, (Spring, 1999) Vol. 77-79, No. 0, pp. 19-34. print.

CODEN: ABIBDL. ISSN: 0273-2289.

DT Article

LA English

ED Entered STN: 2 Sep 1999

Last Updated on STN: 27 Oct 1999

AB Prehydrolysis with dilute acid and steam explosion constitute the most promising methods for improving enzymatic digestibility of biomass for ethanol production. Despite worldwide acceptance, these methods of pretreatment are quite expensive considering costs for the reactor, energy, and fractionation. Using peracetic acid is a lignin oxidation pretreatment with low-energy input by which biomass can be treated in a silo-type system without need for expensive capitalization. Experimentally, ground hybrid poplar and sugar cane bagasse are placed in plastic bags and a peracetic acid solution is added to the biomass in different concentrations based on oven-dried biomass. The ratio of solution to biomass is 6:1 and a 7-d storage period at ambient temperature (20degreeC) has been used. As an auxiliary method, a series of pre-pretreatments using stoichiometric amounts of sodium hydroxide and ammonium hydroxide based on 4-methyl-glucuronic acid and acetyl content in the biomass are performed before addition of peracetic acid. The basic solutions are added to the biomass in a ratio of 14:1 solution to biomass, and mixed for 24 h at the same ambient temperature. Biomass is filtered and washed to a neutral pH before peracetic acid addition. The aforementioned procedures give high xylan content substrates as a function of the selectivity of peracetic acid for lignin oxidation and the mild conditions of the process.

Consequently, xylanase/beta-glucosidase combinations were more effective than cellulase preparations in hydrolyzing these materials. The pretreatment efficiency was evaluated through enzymatic hydrolysis and simultaneous saccharification and cofermentation (SSCF) tests. Peracetic acid treatment improves enzymatic digestibility of hybrid poplar and sugar cane bagasse with no need of high temperatures. Alkaline treatments are helpful in reducing peracetic acid requirements in the pretreatment.

CC Biochemistry methods - General 10050

Biophysics - Methods and techniques 10504

Enzymes - Methods 10804

Food microbiology - General and miscellaneous 39008

IT Major Concepts

Bioprocess Engineering; Methods and Techniques

IT Chemicals & Biochemicals
 ethanol: production; Celluclast: Novo Nordisk Biochem North America, catalyst; Novozym 188: Novo Nordisk Biochem North America, catalyst; Spezyme: Environmental Biotechnologies, catalyst

IT Methods & Equipment
 enzymatic hydrolysis testing: Analysis/Characterization Techniques: CB, evaluation method; high performance liquid chromatography: analytical method, liquid chromatography; peracetic acid biomass pretreatment: Synthesis/Modification techniques, production method; simultaneous saccharification-cofermentation testing: Analysis/Characterization Techniques: CB, evaluation method

ORGN Classifier
 Gramineae 25305
 Super Taxa
 Monocotyledones; Angiospermae; Spermatophyta; Plantae
 Organism Name
 sugar cane
 Taxa Notes
 Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants

ORGN Classifier
 Salicaceae 26695
 Super Taxa
 Dicotyledones; Angiospermae; Spermatophyta; Plantae
 Organism Name
 Populus
 Taxa Notes
 Angiosperms, Dicots, Plants, Spermatophytes, Vascular Plants

RN 64-17-5 (ethanol)
 9012-54-8 (Celluclast)
 9001-22-3 (Novozym 188)
 79-21-0 (PERACETIC ACID)
 9032-08-0 (SPEZYME)

L104 ANSWER 19 OF 25 MEDLINE on STN
 AN 1998290863 MEDLINE
 DN PubMed ID: 9627393
 TI Nonisothermal simultaneous saccharification and fermentation for direct conversion of lignocellulosic biomass to ethanol.
 AU Wu A; Lee Y Y
 CS Department of Chemical Engineering, Auburn University, Al 36849, USA.
 SO Applied biochemistry and biotechnology, (1998 Spring) 70-72 479-92.
 Journal code: 8208561. ISSN: 0273-2289.
 CY United States
 DT Journal; Article; (JOURNAL ARTICLE)
 LA English
 FS Priority Journals
 EM 199808
 ED Entered STN: 19980903
 Last Updated on STN: 19980903
 Entered Medline: 19980824
 AB The enzymatic reaction in the simultaneous saccharification and fermentation (SSF) is operated at a temperature much lower than its optimum level. This forces the enzyme activity to be far below its potential, consequently raising the enzyme requirement. To alleviate this problem, a nonisothermal simultaneous saccharification and fermentation process (NSSF) was investigated. The NSSF is devised so that saccharification and fermentation occur simultaneously, yet in two separate reactors that are maintained at different temperatures. Lignocellulosic biomass is retained inside a column reactor and hydrolyzed

at the optimum temperature for the enzymatic reaction (50 degrees C). The effluent from the column reactor is recirculated through a fermenter, which runs at its optimum temperature (20-30 degrees C). The cellulase enzyme activity is increased by a factor of 2-3 when the hydrolysis temperature is raised from 30 to 50 degrees C. The NSSF process has improved the enzymatic reaction in the SSF to the extent that it reduces the overall enzyme requirement by 30-40%. The effect of temperature on beta-glucosidase activity was the most significant among the individual cellulase compounds. Both ethanol yield and productivity in the NSSF are substantially higher than those in the SSF at the enzyme loading of 5 IFPU/g glucan. With 10 IFPU/g glucan, improvement in productivity was more discernible for the NSSF. The terminal yield attainable in 4 d with the SSF was reachable in 40 h with the NSSF.

CT Biomass
 *Cellulose: CH, chemistry
 *Ethanol: CS, chemical synthesis
 Fermentation
 Hydrolysis
 *Lignin: CH, chemistry
 Saccharomyces cerevisiae: EN, enzymology
 Temperature
 beta-Glucosidase: AN, analysis
 RN 11132-73-3 (lignocellulose); 64-17-5 (Ethanol); 9004-34-6 (Cellulose);
 9005-53-2 (Lignin)
 CN EC 3.2.1.21 (beta-Glucosidase)

L104 ANSWER 20 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 1998:301477 BIOSIS
 DN PREV199800301477
 TI Pretreatment of softwood by acid-catalyzed steam explosion followed by alkali extraction.
 AU Schell, Daniel [Reprint author]; Nguyen, Quang; Tucker, Melvin; Boynton, Brian
 CS Natl. Renewable Energy Lab., Golden, CO 80401, USA
 SO Applied Biochemistry and Biotechnology, (Spring, 1998) Vol. 70-72, No. 0, pp. 17-24. print.
 CODEN: ABIBDL. ISSN: 0273-2289.
 DT Article
 LA English
 ED Entered STN: 15 Jul 1998
 Last Updated on STN: 15 Jul 1998
 AB A process for converting lignocellulosic biomass to ethanol hydrolyzes the hemicellulosic fraction to soluble sugars (i.e., pretreatment), followed by acid- or enzyme-catalyzed hydrolysis of the cellulosic fraction. Enzymatic hydrolysis may be improved by using an alkali to extract a fraction of the lignin from the pretreated material. The removal of the lignin may increase the accessibility of the cellulose to enzymatic attack, and thus improve overall economics of the process, if the alkali-treated material can still be effectively converted to ethanol. Pretreated Douglas fir produced by a sulfuric-acid-catalyzed steam explosion was treated with NaOH, NH4OH, and lime to extract some of the lignin. The treated material, along with an untreated control sample, was tested by an enzymatic-digestion procedure, and converted to ethanol by simultaneous saccharification and fermentation using a glucose-fermenting yeast. NaOH was most effective at removing lignin (removed 29%), followed by NH4OH and lime. However, the susceptibility of the treated material to enzymatic digestion was lower than the control and decreased with increasing lignin removal. Ethanol production

was similar for the control and NaOH-treated material, and lower for NH4OH- and lime-treated material.

CC Food microbiology - Biosynthesis, bioassay and fermentation 39007
 Comparative biochemistry 10010
 Biochemistry methods - General 10050
 Biochemistry methods - Carbohydrates 10058
 External effects - Temperature as a primary variable - hot 10618
 Metabolism - General metabolism and metabolic pathways 13002
 Metabolism - Energy and respiratory metabolism 13003
 Metabolism - Carbohydrates 13004
 Temperature - General measurement and methods 23001
 Microbiological apparatus, methods and media 32000
 Plant physiology - Respiration, fermentation 51508
 Plant physiology - Chemical constituents 51522

IT Major Concepts
 Bioprocess Engineering

IT Chemicals & Biochemicals
 cellulose: hydrolysis; ethanol: product, synthesis, production

IT Methods & Equipment
 acid-catalyzed steam explosion/alkali extraction: softwood pretreatment method; softwood pretreatment: methodological approach

IT Miscellaneous Descriptors
 bioconversions; biotechnology; fermentation; fuels; lignocellulose biomass: conversions; saccharification

ORGN Classifier
 Ascomycetes 15100
 Super Taxa
 Fungi; Plantae
 Organism Name
 Saccharomyces-cerevisiae
 Taxa Notes
 Fungi, Microorganisms, Nonvascular Plants, Plants

RN 9004-34-6 (cellulose)
 64-17-5 (ethanol)
 11132-73-3 (LIGNOCELLULOSE)

L104 ANSWER 21 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 1998:31741 BIOSIS
 DN PREV199800031741
 TI Ethanol production by Kluyveromyces marxianus IMB3 during growth on straw-supplemented whiskey distillery spent wash at 45 degrees C.
 AU Barron, N.; Mulholland, H.; Boyle, M.; McHale, A. P. [Reprint author]
 CS Biotechnol. Res. Group, Sch. Applied Biological Chem. Sci., Univ. Ulster, Coleraine, Co. Londonderry BT52 1SA, UK
 SO Bioprocess Engineering, (Nov., 1997) Vol. 17, No. 6, pp. 383-386. print.
 CODEN: BIENEU. ISSN: 0178-515X.
 DT Article
 LA English
 ED Entered STN: 14 Jan 1998
 Last Updated on STN: 14 Jan 1998
 AB The thermotolerant, ethanol-producing yeast strain, Kluyveromyces marxianus IMB3 was grown on media consisting of straw-supplemented distillery spent wash from The Old Bushmill's Distillery Co. Ltd., Bushmills, Co Antrim, Northern Ireland. Media were supplemented with cellulase activity and fermentations were carried out at 45degreeC. When pulverized straw was used as substrate in this system at concentrations of 2, 4 and 6% (w/v), ethanol concentrations increased to maxima of 1.45, 2.2 and 3 g/l, respectively. Based on straw containing a maximum of 40%

cellulose, these ethanol concentrations accounted for 36, 27 and 24% of the maximum theoretical yield, respectively. When the straw was pre-treated with NaOH and used in the spent wash containing system at concentrations of 2, 4 and 6% (w/v) ethanol, concentrations increased to maxima of 3, 6.2 and 10.5 g/l, respectively and these accounted for 75, 76 and 86% of the maximum theoretical yield. When these results are compared with previously published data relating to the use of straw in laboratory-based media, they suggest that whiskey distillery spent wash may provide an adequate medium for supplementation with complex carbohydrate and subsequent ethanol production in simultaneous saccharification and fermentation processes.

CC Food microbiology - Biosynthesis, bioassay and fermentation 39007
 General biology - Philosophy 00502
 Biochemistry methods - Carbohydrates 10058
 Biochemistry studies - General 10060
 External effects - Temperature as a primary variable - hot 10618
 Enzymes - Methods 10804
 Metabolism - General metabolism and metabolic pathways 13002
 Food technology - Preparation, processing and storage 13532
 Microbiological apparatus, methods and media 32000
 Public health - Sewage disposal and sanitary measures 37014
 Plant physiology - Temperature 51503
 Plant physiology - Nutrition 51504
 Plant physiology - Respiration, fermentation 51508
 Plant physiology - Growth, differentiation 51510
 IT Major Concepts
 Bioprocess Engineering; Waste Management (Sanitation)
 IT Chemicals & Biochemicals
 cellulase; **ethanol: production**
 IT Miscellaneous Descriptors
 liquor industry; agricultural wastes; biotechnology; fermentation;
 fungal growth; media; saccharification; straw-supplemented whiskey
 distillery spent wash; temperature
 ORGN Classifier
 Ascomycetes 15100
 Super Taxa
 Fungi; Plantae
 Organism Name
 Kluyveromyces-marxianus: strain-IMB3
 Taxa Notes
 Fungi, Microorganisms, Nonvascular Plants, Plants
 RN 9012-54-8 (cellulase)
 64-17-5 (ethanol)

L104 ANSWER 22 OF 25 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 1996:315395 BIOSIS
 DN PREV199699037751
 TI Production of cellulase in solid-state fermentation with *Trichoderma reesei* MCG 80 on wheat straw.
 AU Chahal, Parminder S.; Chahal, Devinder S. [Reprint author]; Le, George B. B.
 CS Institut Armand-Frappier, Universite du Quebec, 531 Boulevard des Prairies, Laval, PQ H7N 4Z3, Canada
 SO Applied Biochemistry and Biotechnology, (1996) Vol. 57-58, No. 0, pp. 433-442.
 CODEN: ABIBDL. ISSN: 0273-2289.
 DT Article
 LA English
 ED Entered STN: 11 Jul 1996

Last Updated on STN: 11 Jul 1996

AB It is an accepted fact that ethanol production from lignocellulosic materials is not economical as yet because of the high cost of cellulase production. To reduce the cost of cellulase production, lignocellulosic material (wheat straw (WS)), a comparatively much cheaper substrate, was used instead of costly substrates (pure cellulose or lactose). A pan bioreactor was developed for solid-state fermentation (SSF) that required a small capital investment. High yields of complete cellulase system were obtained compared to that in the liquid-state fermentation (LSF) from WS, when treated with 4.25% NaOH at 121 degree C for 1 h and mixed with Mandels' medium. A complete cellulase system is defined as one in which the ratio of beta-glucosidase activity to filter paper activity in the enzyme solution is close to 1.0. The cellulase system derived from SSF using the pan bioreactor gave more than 85% hydrolysis of delignified WS. The prototype pan bioreactor requires further improvements so that optimum quantity of substrate can be fermented to obtain high yields of complete cellulase system per unit space. The SSF process provides a means for the production of complete cellulase system for the economical bioconversion of renewable biomass into ethanol.

CC General biology - Conservation and resource management 00512
 Comparative biochemistry 10010
 Biochemistry methods - General 10050
 Biochemistry methods - Proteins, peptides and amino acids 10054
 Biochemistry methods - Carbohydrates 10058
 Biochemistry studies - General 10060
 Biochemistry studies - Proteins, peptides and amino acids 10064
 Biochemistry studies - Carbohydrates 10068
 Biophysics - Methods and techniques 10504
 Biophysics - Molecular properties and macromolecules 10506
 Biophysics - Bioengineering 10511
 External effects - Temperature as a primary variable - hot 10618
 Enzymes - Chemical and physical 10806
 Enzymes - Physiological studies 10808
 Metabolism - General metabolism and metabolic pathways 13002
 Metabolism - Energy and respiratory metabolism 13003
 Metabolism - Carbohydrates 13004
 Metabolism - Proteins, peptides and amino acids 13012
 Food microbiology - Biosynthesis, bioassay and fermentation 39007
 Plant physiology - Respiration, fermentation 51508
 Plant physiology - Enzymes 51518
 Plant physiology - Metabolism 51519
 Plant physiology - Chemical constituents 51522

IT Major Concepts
 Biochemistry and Molecular Biophysics; Bioenergetics (Biochemistry and Molecular Biophysics); Bioprocess Engineering; Conservation; Enzymology (Biochemistry and Molecular Biophysics); Metabolism; Methods and Techniques

IT Chemicals & Biochemicals
 CELLULASE; ETHANOL

IT Miscellaneous Descriptors
 BIOREACTOR; BIOTECHNOLOGY; ECONOMICAL BIOMASS CONVERSION; ENZYME ACTIVITIES; ETHANOL PRODUCTION; HYDROLYSIS; METHODS; SUBSTRATE QUANTITY

ORGN Classifier
 Fungi 15000
 Super Taxa
 Plantae
 Organism Name
 fungus
 Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier

Fungi Imperfecti or Deuteromycetes 15500

Super Taxa

Fungi; Plantae

Organism Name

Trichoderma reesei

Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

RN 9012-54-8 (CELLULASE)

64-17-5 (ETHANOL)

L104 ANSWER 23 OF 25 HCPLUS COPYRIGHT 2004 ACS on STN

AN 1992:217978 HCPLUS

DN 116:217978

ED Entered STN: 31 May 1992

TI Direct ethanol conversion of pretreated straw by Fusarium oxysporum

AU Christakopoulos, P.; Koullas, D. P.; Kekos, D.; Koukios, E. G.; Macris, B. J.

CS Dep. Chem. Eng., Natl. Tech. Univ. Athens, Polytechniopolis Zografou, 15773, Greece

SO Bioresource Technology (1991), 35(3), 297-300

CODEN: BIRTEB; ISSN: 0960-8524

DT Journal

LA English

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 16, 51

AB Factors affecting the direct conversion of alkali pretreated straw to EtOH by Fusarium oxysporum F3 were investigated; alkali volume and degree of delignification of straw were the most important. A linear correlation between EtOH yield and both the degree of straw delignification and the alkali level was observed. At optimum delignified straw concentration (4%/volume), a

maximum EtOH yield of 0.275 g EtOH/g of straw was obtained corresponding to 67.8% of the theor. yield.

ST straw ethanol conversion Fusarium oxysporum

IT Fusarium oxysporum

(ethanol conversion by, of pretreated straw)

IT Straw

(ethanol conversion of pretreated, by Fusarium oxysporum)

IT Fuels

(ethanol, direct conversion of pretreated straw to, by Fusarium oxysporum)

IT 64-17-5P, Ethanol, preparation

RL: PREP (Preparation)

(manufacture of fuel, from pretreated straw, by Fusarium oxysporum)

IT 9005-53-2, Lignin, miscellaneous

RL: REM (Removal or disposal); PROC (Process)

(removal of, from straw, ethanol production by Fusarium oxysporum in relation to)

IT 1310-73-2, Sodium hydroxide, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(straw pretreated with, ethanol conversion of, by Fusarium oxysporum)

L104 ANSWER 24 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 1986-180908 [28] WPIX

DNC C1986-078183

TI Cellulosic biomass liquefaction - by catalytic heating

in presence of oxygen-containing solvent and water.

DC H09
 PA (AGEN) AGENCY OF IND SCI & TECHNOLOGY
 CYC 2
 PI JP 61115994 A 19860603 (198628)* 3
 US 4935567 A 19900619 (199027)
 JP 03036872 B 19910603 (199126)
 ADT JP 61115994 A JP 1984-236174 19841109; US 4935567 A US 1986-873257
 19860606; JP 03036872 B JP 1984-236174 19841109
 PRAI JP 1984-236174 19841109
 IC C07C001-00; C10G001-00
 AB JP 61115994 A UPAB: 19930922

The method involves heating the **biomass** in the presence of O-containing neutral organic solvent and water, opt. in the presence of alkaline substance as (a) catalyst, under pressurised inert gas atmos.

The **biomass** is wood chips, wood powder, bark, bagasse, scrap paper, peat or various leftovers (e.g. animal excreta, sludge, etc.). The organic solvent is pref. methanol, **ethanol**, butanol, ethylene glycol, acetone, methyl ethyl ketone, dioxane, methyl acetate or ethyl acetate) and used in an amount of 1-99 weight% of the aqueous mixture

The aqueous mixture is used in an amount of 2-8 weight pts. per 100 pts. of dried **cellulosic** bio-mass. The alkaline material is pref. NaOH, KOH, Na₂CO₃, K₂CO₃, NaHCO₃, KHCO₃, CaO, Ca(OH)₂, Na formate or K formate and used in an amount of 0.001-0.5 weight pts. per 100 pts. of dried **cellulosic** bio-mass. The reaction is carried out at 200-400 deg.C under pressurised inert gas (N₂, Ar or CO₂) atmos. of 5-100 atmos.

USE/ADVANTAGE - The method provides liquid fuel having calorific power of 7,500-8,000 kcal/kg or liquid chemicals as starting materials for preparing chemicals. The liquid prods. are recovered easily from the reaction mixture

0/0

FS CPI
 FA AB
 MC CPI: H09-F03

L104 ANSWER 25 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 1986-023659 [04] WPIX
 DNC C1986-009741
 TI Substrate production used for cellulase production - comprises treating **cellulose-biomass** with hypochlorous acid derivative.
 DC D16 D17 E17
 PA (SNKG) SHINNENRYOYU KAIHATSU GI; (SNKG) SHINNENRYOYU KAIHATSU GIJUTSU
 CYC 1
 PI JP 60244287 A 19851204 (198604)* 4
 JP 05033984 B 19930520 (199323) 4 C12N009-42
 ADT JP 60244287 A JP 1984-102246 19840521; JP 05033984 B JP 1984-102246
 19840521
 FDT JP 05033984 B Based on JP 60244287
 PRAI JP 1984-102246 19840521
 IC C12N009-42
 AB JP 60244287 A UPAB: 19931113
 Producing substrate (I) used for production of cellulase (II), comprises treating a **cellulose-biomass** with a hydrochlorous acid-derivative (III).

Cellulose material is ground, treated in alkali e.g. aqueous sodium hydroxide, at about 120 deg.C for about 30 min., and then suspended in water. It is then treated in a 0.5-20% aqueous solution of (III), e.g. alkali metal salt or alkali earth metal salt of hydrochlorous

acid at 5-55 deg.C for 1-3 hrs. while agitating.

ADVANTAGE - Since the petroleum crisis, **ethanol** has been expected to be produced from **cellulose**-materials by decompsn. into glucose or xylose followed by its fermentation, as a substitute for petroleum fuel. However, **cellulose** materials are difficult to decompose with a cellulase, due to its crystal structure and co-existence of **lignin** in it. The present method enables to turn a **cellulose** material, an **cellulose biomass**, to be easily decomposed with (II).

Dwg.0/0

FS CPI

FA AB

MC CPI: D05-B03; D05-C03C; E10-E04E2; E31-C

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